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AMERICAN DYESTUFF REPORTER

A Weekly Publication devoted to

DYESTUFFS, COLORS and ALLIED CHEMICALS

"Circulated Everywhere Dyestuffs are Used"

Vol. 2 New York, June 10, 1918 No. 19

Food for the Right Kind of Propaganda—The Coal-tar Products Census

THE digest of the U. S. Tariff Commission's census of coal-tar products manufactured in this country during 1917, which is published herewith, will be read with the keenest interest by all who are in the slightest degree concerned with the advancement of the industry.

The outstanding, vital fact revealed is that American manufacturers have at last the long-hoped-for independence of foreign sources of supply practically within their grasp. While it is by no means to be supposed that the crisis is wholly past, or that we are yet in a position to greet the thought of future competition with loud and derisive cackles, yet, from the standpoint of technical accomplishment the results are, perhaps, without parallel in industrial history. And certain it is that the American dyestuff industry is to-day able to stand upon its own feet and give effective battle against the threatened commercial onslaught.

At first blush the census would appear (to the general public) to indicate that the industry has "arrived." We are making, it says, as many pounds of artificial dyestuffs each year within our borders as we were wont to import each year before the war. In other words, we made nearly 46 million pounds here in 1917 where we imported nearly 46 million pounds in 1914.

Now this is the fact which will be blazoned forth in the newspaper headlines for the edification of the aforementioned and usually appreciative general public—which includes among its ranks the Patron of the Department Store. This means much to the future peace of mind of the dye manufacturer, for if the reader of these headlines is careful and genuinely interested, he may read on, and thereby learn that all is not gold that glitters. But the chances are that he has read much and often of the dye situation and has come, for reasons which will appear later, to regard all literature pertaining to it even as the now historic report of Mark Twain's death—greatly exaggerated! Therefore, there is a grand possibility that the headlines referred to will constitute the keynote and the essence of the general impression spread abroad.

The facts of the case, as further set forth in the detailed figures of the census, are that while the sum total of dyestuffs made here equals the former importations, yet in some instances the quantities of certain dyes produced here differs enormously from the quan-

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tities of these same dyes previously purchased from abroad. For example, the census shows that the quantity of synthetic indigo and the important alizarin and vat dyes derived from anthracene and carbazol was less than three per cent. of the quantity of these dyes formerly imported. This decrease in the total number of pounds of dyes available was, of course, offset by a corresponding increase in the production of other and less important colors.

This phase of the truth has long been known to the trade, but it happens to be the one phase which has most persistently escaped the notice of the public at large who sought, in the face of optimistic reports from the manufacturers, an explanation of department store refusals to guarantee American colors. The seeker after knowledge was offered for consideration and reflection an apparent contradiction of facts, emanating from two distinct sources: (1) Department store clerks told him, or her, that prices were up and American dyes could not be guaranteed because there was a great shortage and the colors obtainable were inferior to the German, and (2) he read that this country was making as many pounds of dyes as it formerly imported and that American colors were as good as the German.

The real reason for the unsatisfactory conditions, which were caused by the inevitable hiatus between the time of exhaustion of stocks of imported dyes left over when all shipments ceased and the time when the American manufacturers first began sending their products in quantities to the relief of the mills, has never been forced upon his understanding in such a way as to make it stick there long enough for him to explain the situation to one of his fellow creatures. Hence, we have had a gradual weakening of confidence in public statements about the dye industry, partially buoyed up, it is true, by a patriotic willingness to believe anything good of it, but nevertheless resulting in the creation of a fertile field for German propaganda.

The dye manufacturers and the mill people know full well the makeshifts and artifices, the applications of certain dyes to fabrics for which they were never intended in the feverish desire to obtain results at any price, which followed as a matter of necessity and which must even yet, to a certain extent, obtain. It is an old story to them, but it is not an old story to the general public, despite all efforts to spread beneficent propaganda, and it is to-day furnishing the principal ground for the still alarmingly widespread belief that our manufacturers and chemists are going to prove unequal to their task.

This message must be driven home, once and for all, before it is too late, and the manufacturers and mill owners will do well to give the *modus operandi* their earnest consideration. Whether it can best be accomplished by advertising to or circularizing the department store heads, or by carefully worded statements to the press, or even by the maintenance of a Publicity Bureau charged with the task, is for them to decide. But the point is that they must get busy at once and see to it that fundamental facts, and not merely superficial conclusions, are what reach the public mind.

U. S. Tariff Commission's Coal-tar Products Census Completed

THE United States Tariff Commission announces the completion of its census of coal-tar products for 1917. This group of products includes not only the coal-tar dyes and the crude and intermediate materials required for their manufacture, but also all of the medicinal and photographic chemicals, explosives, synthetic resins, synthetic perfume materials, and flavors which are in any way derived from coal-tar products. There were produced in the United States (not inclusive of explosives and synthetic phenolic resins)

54,367,994 pounds of dyes and other finished products, which have a total value of $68,711,228. The production of the materials known as intermediates amounted to 322,650,531 pounds, with a value of $106,942,918.

The annual production was reported for the following groups of products made in whole or in part from materials derived from coal-tar: 45,977,246 pounds of dyes valued at $57,796,027; 5,092,558 pounds of color lakes valued at $2,764,064; 2,236,161 pounds of medicinal chemicals valued at $5,560,237; 779,416 pounds of flavors valued at $1,862,456; 263,068 pounds of photographic chemicals valued at $602,281; and 19,545 pounds of perfume materials valued at $125,960.

There were 81 establishments engaged in the manufacture of coal-tar dyes in 1917 and their production during that year was practically identical with the amounts annually imported before the war. The imports for the fiscal year 1914 amounted to 45,840,866 pounds and the production in the United States in 1917 was 45,977,246 pounds. However, an analysis of this total reveals that the domestic production, though equal in quantity to the preceding imports, differs in the relative amounts of the various classes of dyes. Only a small production was reported for indigo, and the alizarin and vat dyes derived from anthracene and carbazol—classes of dyes which include some of the best and fastest colors known to the textile trade. The United States produced only 2,166,887 pounds of these dyes in 1917; and the elimination of 1,876,787 pounds of extract made from imported indigo, reduces the output of these dyes to less than three per cent. of the pre-war imports. Dyes of this class are dutiable at 30 per cent. in the Tariff Act of 1916. The lack of development in the manufacture of these particular dyes promises to be remedied to a considerable extent in 1918, for a number of firms have begun their manufacture and a large increase in production can clearly be foreseen.

In the classes of dyes which, if imported, would be dutiable at 30 per cent. plus five cents a pound, the American manufacturers have shown remarkable progress, producing 43,810,359 pounds at a total value of $57,639,990. That this represents something of an excess over the American needs is evidenced by the fact that during the fiscal year 1917, American made dyes to the value of $11,509,287 were exported to other countries. Thus the exports exceeded the pre-war imports in total value although not in tonnage nor in the variety of the dyes.

The development in the manufacture of intermediates is equally marked, for before the war almost all of these necessary materials were imported from Germany. The Tariff Commission finds that intermediates were manufactured by 117 firms in 1917 and that the production amounted to 322,650,531 pounds valued at $106,942,918. These figures, however, are somewhat misleading as there is inevitable duplication in the totals. It is well known that many of the intermediates are derived from other products of the same class. Thus, starting with benzol, the following succession of products is obtained: nitrobenzol, anilin, acetanilid, nitroacetanilid, and nitranilin. Each of these products had to be reported by the manufacturer and hence there has been some cumulative counting.

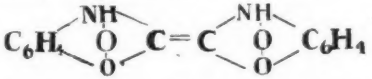
The totals for all of the coal-tar products will be published in the final report, which may well be expected to offer accurate evidence on the progress of the American dyestuff industry.

The Calco Chemical Company, Bound Brook Road, Bound Brook, N. J., is said to be considering the construction of new additions to its plant to cost in the neighborhood of $250,000 to provide for increased capacity.

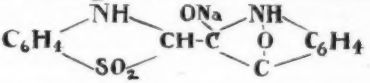
THE CHROMOPHORE OF INDIGO

M. Claasz (Ber. d. deutschen chem. Gesellschaft, September, 1916, page 2079), elaborates his theory of the structure of the indigo molecule. It is believed that the chromophore of indigo and of all its colored derivatives is the grouping CO—C=C—CO connected by a double linkage. This idea arose from the theory of Witt and although it has no analogy in other groups it has been retained. However, this theory of chromophores has been modified in this sense that not only is the presence of chromophores and auxochromes to be considered, but also their reciprocal influence and the faculty which they possess of transposing the double linkages so as to cause the color to appear. It has in fact been advanced that the color itself and its ability to color are to be attributed to a quinonic structure. The indigoids only are excepted.

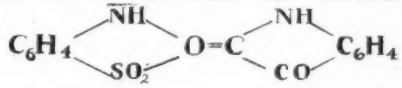
In obtaining thionyl-indigo, which corresponds absolutely to indigo, the author has shown that the chromophore CO—C=C—CO may be replaced by SO—C=C—SO, conserving at the same time the character of the product. As the grouping SO is not a chromophore, there remains only the linking —C=C—, which appears insufficient to explain the coloration. The author admits that in indigo and thionyl-indigo the groups CO or SO and NH which are in ortho positions mutually saturate each other so as to form a sort of betaine, or internal ammonium salt,



which contains orthoquinonic linking. Moreover, in thionyl-indigo the group SO being non-saturated, a relationship of double linkages may again be assumed. Therefore the author has replaced the SO by the saturated group SO_2 and has prepared the compound



which is colored but does not constitute a coloring matter. The condensation of chlor-isatin with sulfuryl-indoxyl furnishes this indigoid, which with alkalies gives a blue salt to which the author attributes the formula



and which is a coloring matter of the same character as indigo itself. It must be admitted therefore that the chromophore of the indigoids is formed by two quinonic benzene nuceil, united, and of which the coloration is variable—

the S is introduced, the latter becomes

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tetravalent, but if S is replaced by O as in oxindigo there is no more saturation of the CO by O, that is to say the linkage is no longer transversal and the product is not colored. In fact, each time that the formation of a transverse linking is impossible the body loses its tinctorial properties; also the bodies which contain the double conjugated linkage, CO—C=C—CO, as in oxindigo (Fries and Hasselbach), carbindigo (Gabriel and Colmann), isoindigo (Wahl and Bagard) are not coloring matters.

The author therefore divides the colors in this group into two classes, *true indigoids* which contain the quinonic indogene (I) or (II) and the *pseudo indigoids,* which do not present this composition. All the true indigoids are coloring matters but those in which the two groups linked by —C=C— are quinonic, are intense colors, those in which a single one of the groups is quinonic give a lessened intensity. Finally, applying the analogy to the series of indanthrenes, the coloration of these bodies can be better explained by admitting also the betaine-like linkage.

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NATIVE DYESTUFF OF SIAM

ACCORDING to Consul Carl C. Hansen, the native dyestuffs which were formerly used to produce the many gorgeous colors for which the Siamese were famous are rapidly passing into disuse. He states that aniline dyes are not manufactured in Siam, and the native vegetable dyes with which the Siamese in the past produced the enduring, bright and beautiful tints on their homemade garments are now being displayed largely by imported dyestuffs. Dyeing in black, however, is still an important industry in Bangkok. Considerable quantities of silk piece goods are sent from China each year to be dyed in the juice of the green berries and leaves of the native tree "maklua" (*Diospyros mollis*). This imparts to the fabric a bright jet-black color which will stand washing. Stuffs dyed in this preparation are enhanced in value.

The heart wood of the jack tree (*Artocarpus integrifolia*) is also largely employed to produce the yellow color of the robes for the Buddhist monks. Among the natural colors which were formerly used more extensively than at present a number are mentioned. For example, a crimson red from "krang" or lac; fine deep red from "krang" or lac; fine deep red from wild "yo" (*Morinda tinctoria*); dark red and violet from "fang" or sapan wood (*Caesalpina sappan*); orange red from the sepals of "kannika" (*Pterospermum acerifolium*); scarlet from the capsules and seeds of "set" (*Rottlera tinctoria*); a beautiful pink color from the corolla of "kan foi" (*Bixa orellana*); and many others, the charming hues and shades of which formerly could be seen in the garments of the natives on festive occasions.

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TARTRAZINE

Tartrazine is to the wool dyer what Chrysophenine is to the cotton dyer. That is to say, although it does not stand the severest fastness tests, its general properties are so excellent and its shade so clear and rich that it may be taken as the standard all-round acid yellow, and as such is known either under its true name or under the designations Acid Yellow A T and Hydrazine Yellow to every dyer of piece goods, of carpet and other yarns, of hats, of garments, and of silk in most forms.

The fastness to light of Tartrazine is excellent without being the absolute best, and the same may be said of its levelling property. Again, without being a milling color, its fastness to alkalis and soap is good, and its fastness to stoving, carbonizing, decatising, and rainwater excellent.

Wool, either in piece or yarn, and wool-silk pieces are dyed with an addition of 1 to 2 per cent. sulphuric acid (or 4 to 10 per cent. nitre cake) and 10 per cent. Glauber's salt. Silk is dyed in a broken soap or boiled-off liquor bath with a similar addition of acid. For viscose silk Tartrazine has no affinity, but Chardonnet silk, as also jute and chip-plait, may be dyed, and in these cases it is advisable to use a concentrated bath with an addition of alum; a temperature above 140 deg. F. is not necessary.

If a minimum of acetic or formic acid be used instead of vitriol, and the dye-bath kept throughout on the boil, the silk in silk and wool goods is left almost pure white, and may be subsequently cleared entirely.

L. B. Holliday & Co. of Huddersfield, England, as a supplement to a recent issue of the *Dyer and Calico Printer,* used a sample card showing dyeings from their Tartrazine made in various fibres. The results were most satisfactory.

CHROME COLORS NOT SUBJECT TO LICENSE

The following decision regarding the Explosives Act should be of interest to our readers:

The Directors of the Bureau of Mines, in charge of Explosives Regulation, has made the following ruling on the applicability of the Explosives Act to the manufacture, handling or use of chrome greens and chrome yellows in the dry, mixed in oil, or other vehicle:

"Amendment to the list of Ingredients of Explosives governed by the law regulating the manufacture, distribution, storage, use or possession of explosives and their ingredients (Public No. 68, 65th Congress, H. R. 3932):

"Chrome Greens and Chrome Yellows are eliminated from the listed Ingredients and will not be subject to license under this Act."

Accordingly, manufacturers, dealers, and users may handle these two substances, formerly listed as regulated ingredients of explosives, without being licensed by this Department or its agents.

F. S. PEABODY,
Assistant to the Director in Charge of Explosives.

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UNITED STATES INVESTMENT IN DYE INDUSTRY LEADS WORLD

IN less than three years the largest dyestuff industry in the world from the point of view of money invested has been built up in the United States. In that short period of time the United States has changed from being an importer to an exporter of dyes, and is now seeking still further enlarged foreign markets for this lusty infant industry.

What this means in relation to the war is that the United States has won a gigantic economic victory over Germany. The United States has smashed with overwhelming blows the German dyestuff monopoly on this side of the Atlantic. She has wrecked Germany's most profitable market for the products of one of her pet industries. She has cut Germany off from a source of prosperity which in the past has meant the employment of thousands of men and the reaping of millions of dollars of revenue.

When the war broke out in August, 1914, there was, broadly speaking, no such thing as an American dyestuff industry. On that date there were about half a dozen factories with about 400 operatives. These factories turned out coal-tar products to the amount of some 3,300 short tons annually. This was the American dye industry of ante bellum days.

At the same time this country imported from Europe about 25,000 tons of dyestuffs each year. Of this amount Germany supplied by far the bulk, or in the neighborhood of 22,000 tons. Our annual consumption of dyestuffs was 29,000 tons. We were abjectly subservient to Germany for dyes for our wools, our cotton and our silk fabrics.

Development of Industry

To-day instead of half a dozen factories producing dyestuffs, there are well over one hundred and twenty-five, with something like fifty more in various stages of organization and erection. Unofficial estimates are to the effect that more than $200,000,000 has been invested in the American dyestuff industry; that thousands of workingmen have been trained in the brand new industry; that hundreds of chemists and chemical engineers are engaged in research work; and that throughout this new industry the leaders are organizing, consolidating, cooperating and building up the structure of a vast business which will not only render the United States permanently independent of Germany, but will go out into the open markets of the world and compete with Germany for their control.

Germany's Dyestuff Subsidies

The many ways by which the German Government lends aid to dyestuff manufacturers, enabling them to sell their products at cost or less in the United States, is explained by Alexander Alexander, in a letter to the New York *Times*, in which he says:

Suppose you need five intermediates to produce a dyestuff. Three of these may be used for explosives or for war purposes, and the Government directs you to produce five times as much of these three intermediates as you need for the dye consumption, and they pay you 300 or 400 per cent. profit on this part of the making up of that dyestuff. I do not think you need any more protection, and you certainly can undersell a competitor who has not Government subsidy, for that is what it amounts to in practice.

For instance, in the making of green crystals, toluol is required. When you nitrate toluol, you get TNT. Now if a green crystal maker produces 1,000 pounds of toluol per day, and sells 800

pounds to the Government at four times what it cost him, the 200 pounds he uses would cost him nothing and he would have some money over, which money he could use in his laboratories

A NEW SULFUR COLOR

A NEW Sulfur Blue has recently been invented by Edward Wray of Fairfield, near Manchester, England (Amer. Pat. 1,247,475, of Nov. 20, 1917). The initial material, carbazyl-N-acetic acid, is prepared by condensing carbozole, or one of its alkaline salts, with chloro-acetic acid or its esters.

This is transferred into an indophenol as follows:

41 parts of p-nitroso-phenol are dissolved in about 410 parts of concentrated sulfuric acid to which external cooling is applied. To this solution 75 parts of carbazyl-N-acetic acid, dissolved in about 750 parts of cold concentrated sulfuric acid, are added, while stirring and cooling well. When the reaction is complete the whole is poured onto ice and the separated product of condensation is filtered off and washed with water until it is free from mineral acid.

In the dry state the indophenol is a dark blue powder which is insoluble in water, or in dilute acids, but is soluble in concentrated sulfuric acid, the solution being green, and is also soluble in dilute carbonate of soda, the solution being bluish-violet.

In the same manner corresponding indophenols (which, however, are not soluble in dilute carbonate of soda) can be produced from the esters of the carbazyl-N-acetic acid.

For the production of the dyestuff, the product of condensation may be used as it is, or it may be reduced to the leuco compound.

Sulfurization is effected as follows:

64 part of sulfur and 120 parts of crystallized sodium sulfid are melted together until the sulfur is completely dissolved; 25 parts of water are added and about 25 parts of the indophenol or of the leuco compound stirred in.

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The solution is then evaporated until the boiling point of the mass has risen to 115°C. at which temperature boiling is continued for about 24 hours, with a reflux condenser. The melt is then diluted with water and purified by blowing air through the mass until the whole is oxidized. It is then filtered from the precipitated sulfur and the coloring matter thrown out from the filtrate by the addition of acid. Or the diluted melt can be completely precipitated by the addition of acid, and the leuco coloring matter be dissolved out by the addition of soda and filtered from the residue of sulfur, and precipitating by acid.

The coloring matter, and also its leuco body, are characterized by their solubility in sodium carbonate solution, from which solution they can be precipitated by means of an organic, or mineral, acid.

In the dry state the dyestuff is a bluish-black powder having a metallic luster and is insoluble in water and in dilute acids, but is soluble in concentrated sulfuric acid, the solution being a moss-green. It is precipitated from such solution on the addition of water, and is of a bright blue color. It is soluble in dilute carbonate of soda, the color of the solution being greenish blue.

The new dye resembles Hydron Blue in one respect as it can be used to dye cotton from a hydrosulfite vat as well as from a sodium sulfide bath. It can be regarded, in fact, as a derivative of Hydron Blue, which is obtained by the condensation product of carbozole and p-nitroso-phenol.

LOSS OF WEIGHT IN DYEING AND BLEACHING COTTON

LOSS of weight in dyeing is due, in the first place, to the removal of the impurities of the raw material; and, secondly, to the degumming action of the assistants added to the mordant and dye baths.

The impurities to which we refer are not the dirt and dust which should be removed if the preparation for spinning is properly carried out, but are in the fibre itself without being an integral part of it. Cotton fibre in the natural state contains 5 per cent. of waxy and resinous matters which impregnate it and, in a measure, adhere to it. These are the pectic matters which are found in most vegetable substances, and far from being of an objectionable nature they give the fibre flexibility and elasticity. They are hardly soluble in cold water; their presence prevents the cold bath from penetrating to the interior of the fibre. On the other hand, the prolonged action of boiling water softens or melts them; they either form an emulsion or are dissolved. Still, the use of hot water in wetting-out cotton takes too long a time to be practicable, and therefore alkalies are used. These easily and rapidly remove the pectic matters, and allow the water to penetrate the fibre.

It is a general rule in dyeing to wet-out the fibre completely before introduction into the dyebath, and in this way to ensure uniformity of absorption and penetration. This is especially necessary when dyestuffs or chemicals are used which are very rapidly ab-

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sorbed. On the other hand, when a long process of dyeing at the boil is necessary the material may be entered into the bath without wetting-out as the gradual action of the boiling bath allows the coloring matter to penetrate sufficiently regularly, and level dyeing is obtained.

It is evident therefore that the loss of weight of the cotton fibre in dyeing may be considerable, owing to the elimination of the waxy and resinous matter, more or less complete according to the effectiveness of the preliminary boiling out. If this has been done with caustic soda under pressure in the closed kier the loss may be 5 per cent., but if the material has been wet-out with a weak solution of Turkey red oil in the open vat at a moderate heat the loss may not be more than 3 per cent.

On the other hand, the cotton gains a little weight by the absorption of the mordant or dyestuff, varying according to the depth of shade and the nature of the coloring matter. For the direct cotton colors in deep shades it is necessary to deduct 2 to 3 per cent. of the loss. Under these conditions, if the cotton has been thoroughly boiled out, the 5 per cent. loss will be brought down to 2 or 3 per cent. If it has simply been wet-out, the loss will be brought down to 1 per cent. after absorption of the coloring matter. It may be, in fact, that there is no loss at all, or, on the other hand, if a very light shade is obtained with a direct cotton color, the deduction for the amount of color absorbed may represent not more than a tenth, or less, per cent.

As regards the basic colors mordanted with tannin and fixed with tartar emetic, the mordant, reagent, and coloring matter all increase the weight, from which must be deducted the loss in boiling out. For instance, if the cotton is wet-out with Turkey red oil so that there is not more than a loss of 3 per cent., the tannin will restore 2 per cent., and the tartar emetic another one-half per cent., and, say, if Methylene Blue is the dyestuff, this will account for another 2 per cent. increase, with the consequence that there is a final gain of 1½ per cent.

With sulphur black the final gain of weight may be 2 to 4 per cent. With the mordant colors, such as logwood black, Turkey red, or the other alizarines, sometimes the increase of weight may reach 8 per cent., owing to the large quantity of mordant absorbed by the fibre.

In bleaching, the bowking, energetic washing, and treatment with chloride of lime and acids eliminate not only the waxy and resinous substances, but also a part of the mineral matters which enter into the constitution of the fibre. Thoroughly bleached cotton is therefore almost chemically pure cellulose. The matters thus removed represent a loss of about 6 per cent., from which must be deducted a slight increase, due to the addition of softeners, which may be estimated at about 1 per cent. The final loss may thus be about 5 per cent. —Translated from *L'Industrie Textile*.

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DYESTUFFS FOR PERUVIAN TEXTILES

AMERICAN manufacturers of dyestuffs and anilines will find markets for their products in Peru. The anilines imported through the port of Mollendo are used in the Andean Sierras, especially in Arequipa, Juliaca, Puno, Sicuani, and Cuzco. The principal consumers of these products are the Indians, who manufacture—in their primitive looms—coarse, heavy fabrics suitable for use in their cold climate. They dye these fabrics in their homes, using vivid colors, and insisting on getting the kinds of dyes that they are accustomed to, often refusing new ones that may be better than the old. Artificial indigo competes for favor with the natural indigo of Salvador. The Peruvian importers of anilines, realizing that they could increase their business by furnishing their customers with an assortment of cheap dyes, formerly interested certain German factories, which sent their products in thin tin cans, weighing 50 or 100 grams each, making it possible for purchasers to obtain an assortment of dyes at low prices. As a result, the dye business has grown, the importation of anilines increasing each year. Before the war the German factories were most popular—practically covering the Peruvian trade in dyes. One large manufacturing house, with the purpose of avoiding competition among its Peruvian customers, prepared for each of them a label in colors representing some Indian subject, this being the only difference in the presentation and designation of the products of that factory. Moreover, it flooded the market with large posters and advertising pictures representing its chemical factories and its position as a first-class manufacturer, the result being that its goods became well known in all wholesale and retail transactions in dyes. The aniline business particularly was very large, and after the impossibility of importing German dyes, the merchants had great difficulty in renewing their stocks.

In order to be successful in this business a factory should present its products in rather small containers and as uniform as possible. The Indian purchaser is very much inclined to cling to his old customs, and to wish to get his dyestuffs put up in the form which he has found convenient. Heretofore anilines have been imported in small tin cans of rectangular shape, with a capacity of 50 or 100 grams, wrapped in paper of the same color as the dyes—that is, if the cans contain red dye, they are wrapped in red paper. On each tin can is placed a label in bright colors, lithographed, and usually representing some native Peruvian subject, such as a puma, or a llama, an Indian, etc., and the designation of the color. On the opposite side is the label "imported by so and so" (name of importer), and a statement of the net weight in grams. Seals of the producing factory also appear on both sides. In addition, the tin cans are covered with white silk transparent paper through which the trade-mark and the name of the dye are seen.

The boxes in which dyes are ex-

United States Conditioning & Testing Co.

NEW YORK 340 Hudson St. | PHILADELPHIA 205 Chestnut St. | PATERSON 220 Ellison St

General Textile Testing

Dyestuff and Color Tests

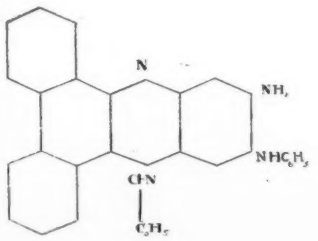
Microscopic examinations Photomicrographs

ported should be of light solid wood, as duty is paid on weight in the customhouses. Therefore, the matter of packing is very important, and lightness should be attained as well as the safety of the goods. Inside the box a waterproof paper lining should be placed to protect the colors against the moisture of the sea air. Cases containing 400 tin cans of 100 grams each have a net weight of 40 kilos and a gross weight of 65 kilos; cases containing 800 tins of 50 grams each have a net weight of 40 kilos and a gross weight of 76 kilos.

The German aniline factories also provided dyes to most of the weaving and tanning factories, and this likewise amounted to a considerable business. Aniline is shipped in barrels of 50 to 100 kilos, with an inner lining of tin plate to resist the moisture of the sea voyage.—*Consular Report.*

NOTES CONCERNING THE AZINE COLORS

F. Kehrmann and Speitel have prepared phenyl-aposafranine by a new method consisting of eliminating the amino group of pseudomauveine, or monophenyl-phenosafranine, by the ordinary procedure. It is known that by the action of aniline or phenyl-aposafranine, there is formed a 2-3 dianilide derivative. The authors have found that besides this there is formed a compound which they have identified as symmetrical diphenyl-phenosafranine. The constitution of the derived anilide of amino-2-flavinduline was made the object of other researches with the collaboration of Weilenmann, Stoffel and Kehrmann have attributed to this derivative the formula—



The authors now prove the correctness of the formula, causing the synthesis of this coloring matter by condensation of phenanthrene-quinone with dianilido-4-6-metaphenylenediamine. The base in question forms leaflets with green metallic reflex, melting at 235°. Its solution in concentrated sulfuric acid is green-blue. The authors have prepared the nitrate, the chloroplatinate and the bichromate.

Kehrmann finally communicates some observations he has made on the indamines, with the collaboration of W. Poplawski. They have prepared some aromatic indamines with the object of determining if the introduction of arylenes into the amino group of these compounds sufficiently modifies their tinctorial properties from the special point of view of resistance to light and to acids so as to permit of industrial employment. This was not realized, however, but the following colors which are meanwhile sufficiently resistant to washing have been shown to be easily prepared.

Indamine of nitroso-acetamino-diphenylamine and metatoluylene-diamine,—a dark-blue crystalline powder, colors cotton mordanted with tannin an indigo-blue shade; of nitroso-diphenylamine and metatoluylene-diamine,—the same; of nitroso-ethyebruzyl-aniline sulfonic acid and metatoluylene-diamine a blue color but litle resistant to light. The condensation of nitroso-thyl-alfanapthylamine with metatoluylene-diamine gives an azine of which the chlorhydrate in soluble in water and in alcohol with fuchsine-red color and yellow orange fluorescence. Lastly the authors describe the indamine of acetamino-nitroso-diphenylamine and diamino-2:4-anisol, which colors cotton mordanted with tannin like that of the metatoluylene-diamine, and the azine of nitroso-di-

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methylaniline and diamino-anisol, which fixed on cotton mordanted with tannin is the same shade as the neutral red. This azine, which crystallizes in leaflets having a feeble metallic reflex, melts at 258°, and has been prepared by making the chlorhydrate of diamino-anisol react at 60° on the chlorhydrate of nitroso-dimethylaniline in the presence of acetate of soda. After having been heated for an hour, the product is cooled in water, is acidulated with acetic acid and heated again for twelve hours while passing a current of air. The solution, which has passed from blue to red during the operation, is then precipitated with NH_3 to obtain the azine which is distinguished from the red derived from toluylene by replacement of methyl with a methoxyl group.

(Abstract, Bull. Soc. Chim., 1917, *21*, 618).

HELIO LAKE

HELIO Fast Red, discovered in 1908, was imported from Germany into the United States, prior to the war, in considerable amount, for use in calico printing. The coloring matter is now made regularly in this country and furnished to the printers of cotton cloth. The manufacture is not difficult. It results from diazotising nitro-toluidine, and developing with naphthol. It yields a scarlet of a brighter and more yellow shade than that given by Para Red. The product is not strictly a lake, because a lake is really an insoluble coloring matter produced from a soluble color by combination with its mordant. An example is the tannin lake of Methylene Blue. The helio lake is an insoluble coloring matter produced from a substance which is already insoluble. It is applied to cotton cloth by printing in the regular way with blood albumen (as a pigment).

It is also used in paints. Since it is not so easily soluble in oil as Para Red, it has the advantage of not diffusing from paints as does the latter.

The lake quickly won for itself recognition after its introduction, on account of its remarkable fastness to light and washing, combined with a high degree of covering power and slight solubility in alcohol and oils.

CLEARING HOUSE
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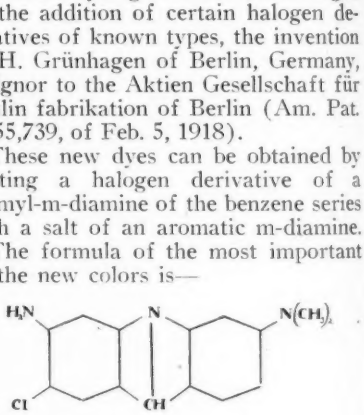
COLORS
SPECIALTY:
Brilliant Fast Sky Blues
DYE EXCHANGE CORPORATION
141 BROADWAY NEW YORK

NEW DYES OF THE ACRIDINE SERIES

The series of acridine dyes, so valuable in the dyeing of leather, is enlarged by the addition of certain halogen derivatives of known types, the invention of H. Grünhagen of Berlin, Germany, assignor to the Aktien Gesellschaft für Anilin fabrikation of Berlin (Am. Pat. 1,255,739, of Feb. 5, 1918).

These new dyes can be obtained by heating a halogen derivative of a formyl-m-diamine of the benzene series with a salt of an aromatic m-diamine.

The formula of the most important of the new colors is—



Its preparation is as follows:

17 parts of 1-amino-3-formylamino-6-chlorobenzene are melted together with 21 parts of 3-aminodimethylaniline hydrochloride in an enameled iron vessel, provided with an agitator and with an oil bath. The temperature is gradually raised to 180° C. and the reaction is finished when the evolution of water vapor ceases. The melt is dissolved in water, the solution filtered if necessary and the dyestuff precipitated by adding a solution of common salt and of zinc-chloride. The new dye, in the dry

state and pulverized, forms a brown-black powder. It dyes leather clear reddish-yellow tints.

Numerous variations are, naturally possible. Instead of m-aminodimethylaniline a C-alkylated derivative thereof may be used, such as 4-amino-2-dimenthylamino-1-methyl-benzene, or a halogenated derivative such as 4-amino-2-dimethylamino-1-chlorobenzene. Furthermore, bromo-derivatives may be employed instead of the chloro-derivatives.

War Trade Board Issues New Manual to Guide Shippers

The War Trade Board has issued "Rules and Regulations No. 2," superseding "Rules and Regulations No. 1," issued November 1, 1917. The publication constitutes a manual for shippers. The issue of November 1 was devoted to exports. The new edition concerns itself with official statements and rulings of all of the ten bureaus of the board.

Only such rulings appear, however, as are in effect at the date of publication, May 1, covering the control of exports, imports and trading with the enemy.

The new edition was considered necessary because much of the material in the first edition has been superseded by subsequent regulations of the War Trade Board, which were published from time to time in the *War Trade Board Journal.*

Experiments in Indigo

The annual report on Agricultural Progress in India for 1916-17, lately issued, gives some interesting details of the indigo experiments. Surprising increases in yield during manufacture have been obtained at many Behar factories by the use of *dhak* (palasa tree) gum (*Butea Wondosa*) to promote better settling. The actual increases effected have been from 3 to 6 seers per 100 maunds. It should be explained that there are 40 seers to the maund. In some factories the yield has been increased 40 to 60 per cent. by this means. The indigo suffers no appreciable loss of quality by the use of a minute proportion of a solution of the gum added to the indigo vats after beating. The gum merely promotes better settling of the finely divided indigo, and prevents loss in the large volumes of "seetwater" which have to be run off after settling. This water frequently contains one part of indigo in 10,000—that is, 0.01 per cent.—equivalent to a loss of 30 per cent. of the make. The use of *dhak* gum not only improves the yield, but greatly facilitates filtering and pressing.

Notice of authorization has been filed by the Williams Chemical Corporation of Delaware to operate a plant at Avenue E and Fifteenth Street, Bayonne, N. J., for the manufacture of dyestuffs and chemicals.

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115 Broadway, New York

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The application of dyestuffs to textiles is as important as their production. The technique of this branch of the color industry has for years commanded the best talent among those dyestuff distributors who have catered to the highest class of trade.

An intimate knowledge of the possibilities of every dyestuff is often necessary to meet the particular requirements of the consumer. Dyeing is a chemical, not a mechanical process, and the variation of local conditions, due to differences in quality of water, steam and chemicals, makes the dyehouse problem an individual one.

Such problems are welcomed by the technical department of this company, which is manned by chemists who have been picked because of their knowledge, practical experience and demonstrated ability. We have long maintained well-equipped laboratories at our different offices for this purpose, and invite inquiries and extend, without any obligation on the part of our customers, our services to all who stand in need of them.

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